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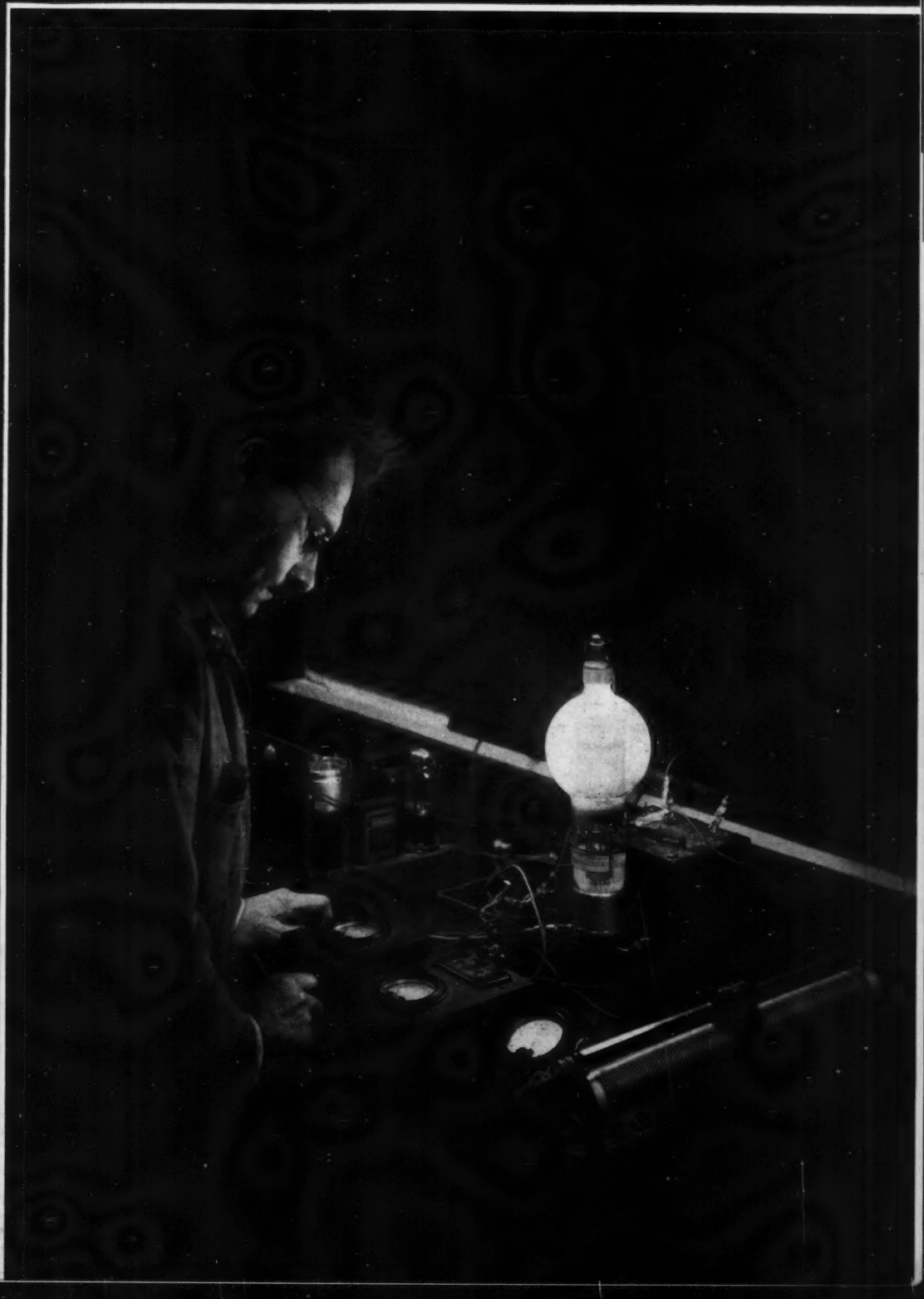
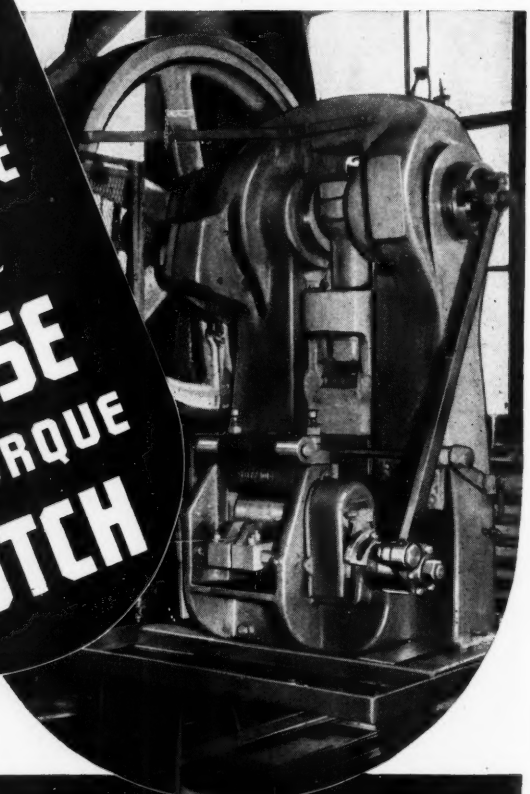
# The CORNELL ENGINEER

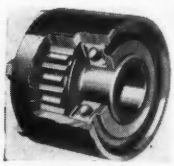


# 20,000,000
## ACCURATE RATCHET MOVEMENTS IN A YEAR

AND NOT A BIT OF TROUBLE *With the* MORSE HIGH TORQUE CLUTCH



*Morse*



FREE WHEELING AND INDEXING CLUTCHES

120 times a minute, the Morse High Torque Clutch moves flat bar stock into the mouth of this press. It's a job calling for complete dependability and accuracy, and the Morse Clutch, replacing a ratchet feed, has done the job without a bit of trouble of any kind since installation a year ago.

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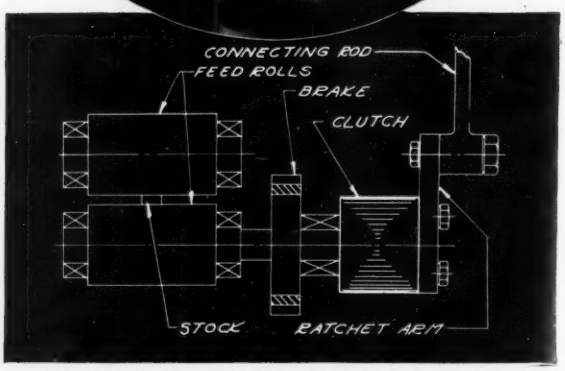
In hundreds of power transmission uses, Morse Clutches are setting new standards of efficiency and trouble-free operation. The Morse man in your territory will be glad to consult with you on ways in which you can utilize these power-saving, money-saving pieces of power transmission equipment.




Above is a press for punching hex nuts. The Morse High Torque Clutch indexes ⅛" flat bar stock up against a gauge by means of feed rolls, with 120 ratchet movements per minute. The Morse Clutch replaced a ratchet feed on this machine, with great improvement in efficiency.

SILENT CHAINS ROLLER CHAINS FLEXIBLE COUPLINGS KELPO CLUTCHES

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# EDITORIAL

From time to time there has appeared on the pages of this magazine an editorial column. It has had its ups and downs, and for the past years has been discontinued entirely due to the lack of material and the small size of the senior editorial board.

It is our belief that there are some matters of interest to our readers which should appear on an editorial page, as they do not fit into any of the other established departments of the magazine. Now that there are five members of the senior editorial board instead of two, it will again be possible to revive the column. However, it is not our intention to attempt to run a given size department every month, but to vary its size with the amount of material that presents itself, and to leave it out entirely if interesting material is lacking.

Our first duty is to express publicly the appreciation of the entire board for the fine job which the recently retired seniors have done in improving the magazine and furthering its interests. They have left us with a high standard of attainment to shoot at, and it is our hope that we will be able to carry on the work of improvement which they have instituted.

**Student Written Articles**

Several readers have approached us recently with the question "Where do you get your articles?" and an explanation of our policy in this respect seems to be needed.

As you have no doubt noticed, over half of our feature articles are written by alumni of the Engineering School. The reason for this is that our alumni have a background of experience in industry and are therefore more capable of writing articles of interest to all our readers than are student authors. In this category fall articles which we have received from various professors on research topics. Cooperation from these sources has always been splendid, and articles seem to be available for the asking.

The ENGINEER, however, is a student publication, and we always endeavor to have at least one student author represented in each issue. The cooperation from this group of readers has not been nearly as hearty as from the alumni, probably because the students do not realize that we would welcome their articles. To date, a large portion of these articles have been written by board members, and have proved to be popular, but our ideas are limited and we would greatly appreciate your help.

It seems almost universally true that every student has a particular interest in some phase of engineering which he could easily write up in the form of an article, and that in some cases he has already incorporated it in a theme or report. Surely it should not be difficult to expand it to article size, and the experience gained in writing for publication is well worth the effort.

If you have some pet idea that you would like to have published, why don't you talk it over with some member of our staff or come up to the office in room 40, Lincoln Hall? Since we cannot guarantee that anything you write will be printed, it is advisable to talk your idea over with someone who has had experience with the magazine in order to determine whether or not it is acceptable.

The experience of having a paper printed should be of great value to any engineering student, because it is by this method that he will get his name before the public later on in life and attain prominence in his field.


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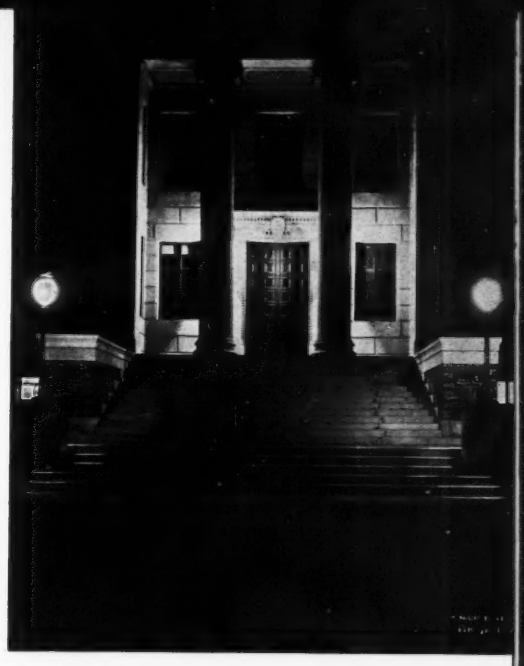


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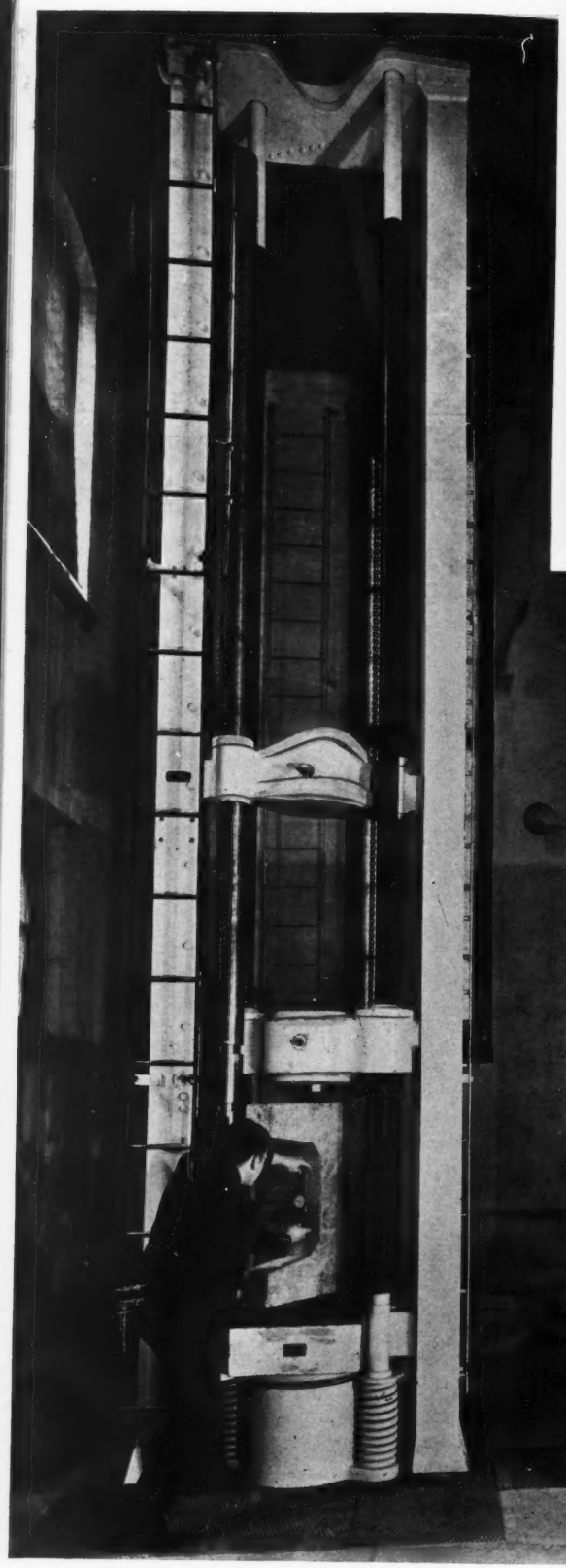


## Testing Machine

*(Courtesy of Baldwin-Southwark)*

The return of spring to the cam pus turns the thoughts of engi eers to Cornell Day. This yea the testing machine in the base ment of Lincoln Hall will agai be used to break beams befor the amazed eyes of our guest If only they knew how their eye will ache from writing repor on similar experiments.

# TELEVISION

## TODAY AND TOMORROW

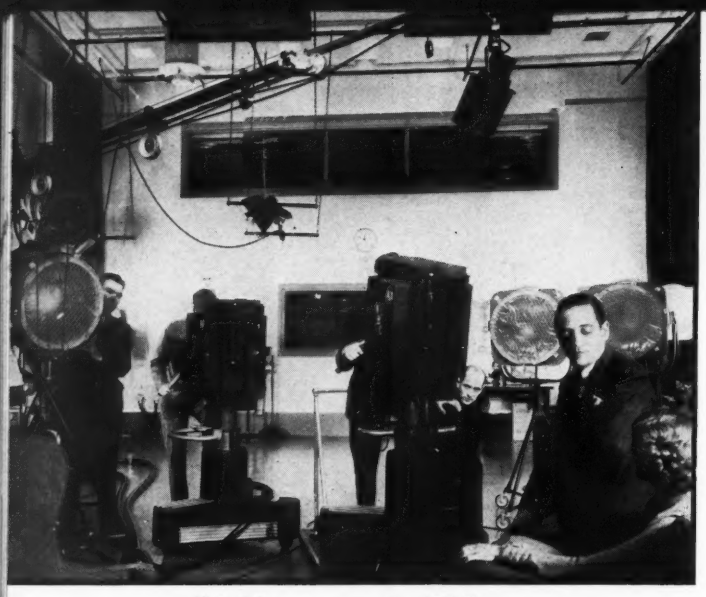
*By* ROBERT C. ROSS, A.E. '41

Television eye, the Iconoscope, which converts an image into electricity and dissects it into countless separate picture elements.

Television is a much talked about subject of which little is known by the average person. Up to the present, television in this country has not been a practical success. Retarded by many problems of transmission and reception, rapid development of television has only taken place the last few years. The chief problem is that of sending an enormous amount of information about light, and sound of an image in an infinitesimal time over the air. Unlike the radio and the telephone which have to transmit only one sound, complex though it may be, at a time, television has to transmit a thousand shades of light as well as sound in a short enough space of time so that it appears instantaneous to us. This is done by means of the iconoscope, which is a vacuum tube containing an electron gun and a plate composed of mosaic of silver built up on a sheet of mica backed by a metal plate. The image to be transmitted is focused by the lens of the camera containing the iconoscope upon this plate. The light from the image sets up on the silver mosaic electrical charges proportional to the intensity of the light on a particular spot. A stream of electrons from the electron gun acts as a conductor and picks up the charge on the plate creating a current proportional to the charge. This stream of electrons scans the plate in 441 lines skipping alternate lines then coming back and getting the rest. 441 lines are the least number of lines that will still give a smooth image when transmitted. The stream of electrons covers the plate 60 times a second or picks up 30 complete images a second.

The high frequencies of the carrying current produce more problems. An expensive type of cable called coaxial must be used to carry the current from the camera to the amplifier and to the transmitter or between stations because no other wire will carry this high frequency current. Because of the high cost of coaxial cable, it is doubtful whether it will be used between stations. The air waves, moreover, can not be picked up farther away than the horizon because like light waves they travel in a straight line and leave the earth as it curves away from them. Therefore, for a program to cover the country, it will mean a thousand repetitions from a thousand stations. Each station will have to have special studios, to have special equipment, to employ careful staging, and so on for every program except for news and sporting events. Also because of the property of the waves to travel in a straight line, any building or similar object blots out the reception behind itself and throws reflections or "ghosts" upon other screens.

This high frequency wave has to be captured and reconverted into an image. The kinescope, an inversion of the iconoscope, is used for this purpose. Its electron gun is syncronized to the gun of the iconoscope by two different pulses transmitted after each half scanning of the image by the electron gun of the iconoscope. Other minor problems of reception, solved and unsolved, include the standardization of receiving sets, the building of the so-called "fool-proof" sets which require none of the technical adjustments, and the creation of a suitable means of increasing at will the



**Televising a scene in N.B.C. Studio at Radio City, New York.**

size of the projected image effectively.

The most pertinent problem of television is, when shall we have television? The National Broadcasting Company and The Columbia Broadcasting System are going on the air with scheduled programs in New York City at the opening of the New York World's Fair April 30, 1939. Other stations are soon to be operated in many of the large cities of United States this year. Eventually, all of the metropolitan areas of this country will have stations. But for the rural areas of this country, television waits upon some future development that will enable it's high frequency waves to encircle the earth as our present-day radio waves do.

Before the large radio companies can form networks, they have to have stations to include in their net works. The establishment of a station requires a large financial outlay. The prospective builder must obtain a construction permit from the Federal Communications Commission after he has shown himself legally and financially qualified and possessing the technical facilities needed to carry on the programs. The R.C.A. transmitter now on the market costs $60,000 with one pickup camera or $100,000 with two pickup cameras and does not include the cost of installation or studio equipment. Thus the total cost of a station, including a newly built and furnished studio, a transmitter site, a 400 foot tower, and a queer football-shaped antenna, exceeds $150,000. Once the stations are built, there are three possible ways of forming a network. Coaxial cable could be laid between cities but it is very expensive, would have to be buried, and would require booster stations every five miles. Broadcasts could be relayed by repeater stations set every twenty miles between stations but is still too expensive. "Guided waves" which lie close to the dividing line between radio and light waves, can be piped on the inside of hollow tubes if the inside is insulated but too little is known of them to use between stations at present.

To persons within the range of a station, receiving sets are now available. The sets resemble radios, varying in size from that of a large table model to that of a large console radio, and have five controls: three radio controls because sound is still transmitted by the usual method of radio, one controlling the contrast between light and shadows in the image, and one controlling the brightness of the image. The image is viewed in a mirror fixed in the top of the set at a 45 degree angle to the set and measures 8 by 10 inches. The prices of the sets vary from $100 to $1,000 depending principally upon the size of the kinescope used in the set. These sets do not fade nor have any natural static because of the properties of the high frequencies. However static may be caused by an automobile or a doctor's diathermy machine, which will tear sections out of your image and produce highly uncomplimentary sounds in your speaker.

The high cost of television is due not only to the cost of research but to the large initial expense of establishing a station and to the cost of new techniques that have to be found for almost everything—for acting, script writing, selecting subject matter. So far television has had no earnings and has had to be financed by earnings of the companies from other sources, by interested motion picture companies, by banks, and by public sale of stocks. Advertising by television is three times more effective than by radio, and it is from advertising that the ultimate earnings of television will be derived. Before an advertiser can afford to sponsor and pay for the cost of a program, in such an area as the New York area there must be 400,000 sets in the homes. It will be at least five years before there will be 400,000 sets in use in New York. Television costs $2,000 an hour, or at 400,000 sets ½c per hour per family.

Television offers little threat to the motion pictures. Motion pictures cost $200,000 per hour and such a cost could not be borne by less than 100 stations. Motion pictures will have to be produced at much less cost before television can afford to use them. One solution is to film a television show and ship the film around the country. In addition all film produced commercially abroad and in this country, would only supply just three hours entertainment a day.

Today, 1939, television still has many problems to solve, but is now practical and available to the pub-

(*Continued on page* 22)

# DYNAMICS OF PRESENT-DAY ECONOMY

*By* CARL S. COLER, M.E. '11

**A heart-to-heart talk with the Engineering Seniors of Cornell University by C. S. Coler of the Class of 1911, now associated with the Westinghouse Electric & Manufacturing Company as a member of the Company's Industrial Relations staff.**

●

*Memory Pictures of Days at Cornell*

I would like to paint for you several pictures of the vivid memories of Cornell days which crowd my mind at this time. A freshman, in a small gray cap, climbing the hill from the foot of University Avenue, anticipating the adventure of higher education, afraid of the unknown problems ahead, inspired by fleeting glances at the Lake and gorges, lead on by chimes which measured the approach of an "eight o'clock."

The memory of a table-waiter (one had to eat then, as now) setting up the tables and serving the hash to a starving army of young rough-necks. The by-products of this experience, as viewed now, were in many cases more important than classroom routine. There was the discipline of meeting responsibility and the study of human nature. The experience of keeping hungry people happy may yet prove to be a useful asset in these days of near-chaos. I even on one occasion spilled soup down the neck of Dr. Mann who later became your Provost.

There were extra-curricular activities. I recall the cold day in early spring when, with a very good-looking coed, I broke through the ice of Beebe Lake on a toboggan. We were younger then and we could take it, but I have not since seen the young lady. Then I recall on several occasions, when financially hard pressed, watching the Big Red Team down on Percy Field, from the vantage point of a tall tree which fortuitously grew on the hill overlooking the field.

There were personalities: Diederichs, with his booming voice; Kimball, the most beloved young instructor; Karapetoff, with his philosophy and his Sunday evening piano recitals; and Uncle Pete, dear old Uncle Pete, who lectured to us regularly, but I only recall now a few things that he said. Speaking of the work of an engineer, he cautioned us over and over again to keep two questions in mind when tackling a new job: first, can it be done technically? second, will it pay? Years of experience and a new order prompt me to add one additional question which all engineers should now ask themselves before proceeding, is the project under consideration socially desirable?

Recently Cornell has called one of our young engineers, Dr. William Lewis, to head your Department of Electrical Engineering. It is my personal opinion that Bill, when he gets into his stride, will add additional luster to Cornell's reputation as a great engineering school. As a young man Bill worked in the Westinghouse Service Department at Los Angeles. After some three years of practical experience, he won a Westinghouse War Memorial Scholarship. For seven years the Company assisted in financing his studies until he secured his doctor's degree at the California Institute of Technology. In my opinion, he has what it takes.

*Dynamics Economics*

When I was a student most of the engineers had trouble with their dynamics and very few of us understood what we were taught about economics. Perhaps an understanding of both of these subjects has to come more through experience than by instruction. Today more than ever the engineer needs to understand dynamics, the science of motion, and economics, the science of human welfare.

There are two ways in which we can hope to improve our condition. The first is by changing our en-

vironment, called technology; the other by changing ourselves, called education.

Our economy is really a problem in energy. We are interested in balance and control, fundamental elements in the problem of the kinetic energy of labor and the potential energy of capital. The business cycle might be compared to surges on a transmission line, to speed changes in a revolving flywheel. Static problems are simpler but seldom met in operation. Dynamics problems are more complicated.

The old economic order from which we are emerging was more like a balloon. It was supported by fundamental needs but it had no power of propulsion and little opportunity for self-control. The new order is more like an airplane. It is kept up by speed. We now have more opportunity for self-control but the price of a mistake is tremendously greater. Control, whether of machinery or of men, must keep step with the power involved. To rank today as an engineer or as an executive, one has to be more intelligent, more skilled, better educated, and more honest than those who attempted to achieve under a more elemental economy.

In the field of production, we have successfully harnessed Nature's power; we have built complicated machinery which has lifted the burden of work from the shoulders of men; we have developed scientific management. Success in this field has lead to big operations which require big men to manage them.

I recently walked through the great power machinery aisle of our East Pittsburgh Works. On test there is one of the giant generators for Boulder Dam. Forty feet in diameter, it weighs more than two million pounds. It will produce 82,500 k.v.a. For thousands, possibly millions of years, mankind has suffered with poor artificial illumination. During the past fifty years, engineers have developed the electric light, which is 160 times cheaper than candlelight, even if the candles are purchased at the 5 & 10c store. Recently we shipped the frame-work and bearings for the great 200-inch Mt. Palomar telescope. It weighs 125 tons and has to operate, in following the course of a star, with the precision of a watch. This great telescope when completed will bring the moon to within twenty-four miles, equivalent, of the earth.

In the field of distribution, we have high-speed transportation, chain stores, advertising, high-powered salesmanship, and credit expansion. When our economic order gets out of balance, we know from recent experience how devastating the resulting depression may be.

Strikes and wars have about the same effect in our present economic order that uncontrolled lightning, hurricanes, or floods have on our power stations. Our whole business structure, in fact, is built on confidence. A breakdown in integrity has the same effect on our economic order that a breakdown in insulation has in an electric machine. So inter-related have our domestic and international economy become that a waste in Africa, or some other remote region, in some small way affects our standard of living.

Because of better means of communication, psychology and economics are now more closely related than ever before. It used to be important for the engineer to be able to handle human relations. To you young men who shortly are going out into the field of engineering, this ability is essential. People's wants and desires are the voltage of our economic system; business is the current; price is the resistance; and confidence is the power factor.

*Good Leadership is the Goal*

Good leadership is the answer to most of our present-day problems. It should be the ultimate goal of an engineer, whether he applies himself to problems of technology or of humanity. The little gadget, which you know as a "zipper" well illustrates the important relationship which exists between the leaders, the workers and savers, and the users in our present-day, high-powered economy. The little projections on one side might be compared to those who work in an industrial enterprise. The projections on the other side might be considered as those who have invested a part of their savings in the company. The pieces of tape to which the projections are fastened represent the common interests of workers and savers respectively. Neither of these interests is worth anything, however, except in respect to the interest of the users. In the case of the zipper, its utility consists in closing an opening, at times a very responsible task. The device which gets the two parts of the zipper together might be compared to the executive in an industrial enterprise. You will note that it accomplishes its purpose by working on individuals and getting their attitudes right toward each other. Also you will note that the executive should not be too firmly attached to either side. Rather, he should be free to move between capital and labor more or less as a catalytic agent.

Such a leader was George Westinghouse, who as a young man went to Pittsburgh to work out ideas for the safety and comfort of people. He developed the confidence which was necessary to attract the money and the workers to his enterprise. It has been my good fortune during the past twenty-five years to have employed and trained a good many thousands of men for the Westinghouse Company. Nearly half of these men have become leaders of either some phase of technology or of men. I recall Bill Swartley, whom I interviewed here in 1930. Within a few years he had the opportunity of working in the office of our Vice-President

*Continued on page* 28)

HOUSING PROJECTS —*Courtesy of Architectural Forum*

# THE PROBLEM OF HOUSING AMERICA

*By* R. J. REEVES, C.E. '40

The United States of America is a modern, progressive country. Advancing rapidly, within the past century it has developed from a small rural country into a great industrial nation, foremost in scientific and technical ability, and proudly claiming the highest standard of living.

But America's pride in its high standard of living has been rudely shaken by events of the past decade which have revealed the filthiness and squalor in which the great masses of the people live. For housing has been overlooked and sadly neglected during the past century, until today most cities have large areas of slums where people live crowded together in filthy tenement houses; and similarly the countryside is filled with dwellings woefully inadequate for modern living.

The American people cannot continue to remain so poorly housed, for the cost in life and in money is increasingly great. Because of these disgusting housing conditions, crime and immorality are stimulated, disease spreads and takes its toll of human life and suffering, and accidents and fire kill and cripple thousands. The cost of maintaining these slums, these blighted areas, is a burden to the rest of the community, for taxes collected in these areas pay only a small fraction of the cost of the police, fire, health, and sanitary services that are required.

Adequate housing must be provided. To do this at least a million dwelling units must be built each year for the next ten years. It is improbable, and no doubt impossible for this to be done, yet the social and economic effects of poor housing make imperative the construction of as many dwelling units as possible.

The economic problem of providing adequate housing is the most difficult to solve. At the height of prosperity, in 1929, the average annual family in-

THE JUNIATA PARK HOUSING DEVELOPMENT IN PHILADELPHIA —*Courtesy of Shelter*

come in this country was $1700, and 21% of the families had incomes of less than $1000. Frankly, adequate housing costs more than these people are able to pay. Those who need improved housing most are those who are least able to pay for it. Housing is not only an individual concern; it has also become the concern of society, and society should be willing to help pay the bill. Society provides free schools, free roads, and free parks, and likewise should help in providing better housing. Subsidized housing appears to be inevitable if the housing situation is to be remedied.

The American government first entered the housing field during the World War, when it built homes for war workers concentrated in certain areas. From then on it did little until 1931. Following the investigations of the President's Conference on home building and home ownership in December, 1931, the government began to attack the housing problem. Through various agencies such as the RFC, PWA, Resettlement Administration, HOLC, FHA, and others, it has been trying during the past six years to finance housing, build housing projects, and stimulate the construction of housing as much as possible. With these activities the government has made a start in providing the country with adequate housing. Legislation recently passed and other legislation proposed by a congressional group headed by Senator Wagner provide for continued and increased activity toward this goal.

(*Continued on page* 28)

# Prominent Among Our Faculty

## John Edwin Perry

**Professor of Railroad Engineering**

Professor Perry has shown his versatility both in the School of Civil Engineering and in the community of Ithaca. Distinguishing himself as a successful practicing engineer, professor, personnel adviser, politician, and Scout leader, he has unstintingly contributed his services to both the University and the City of Ithaca.

John Perry spent his early years in Pennsylvania. Soon after graduating from Penn State in 1908, he became affiliated with the Pennsylvania State Health Department, supervising the construction of sewage disposal plants and working on topographical surveys. But by the time 1910 had rolled by, Engineer Perry was engaged in the field of civil engineering which he has since specialized in—railroad engineering. His first railroad experience was acquired carrying out heavy construction along the Ohio River. After two years in Ohio, he was transferred to the Chicago and Alton R. R. surveying and supervising the construction of the railroads of Chicago Terminal Freight yard. Mr. Perry later worked on track elevation in Chicago and Milwaukee for the Chicago, St. Paul and Milwaukee Railroad.

One year after the start of the World War, John Perry came to Cornell; and since then he has taught many engineering courses, including Railroad and Highway Engineering, Engineering Law, Engineering Construction, Freshman Drawing, and Elementery, Advanced, and Route Surveying. Through his work at the Summer Survey Camp, and as Personnel Advisor, he has built up a wide acquaintance with Cornell alumni.

When the C. E. School organized a personnel department in 1931, Professor Perry was appointed to take over the work. Advisor Perry makes composite ratings of each student late in the Junior year from which suggestions on how to overcome certain harmful traits are made. His work also includes compiling an activity record of each member of the class. Early in the Senior year, Professor Perry interviews the student and a record is drawn up as to particular desires regarding future employment. Not only does he help the present Senior class obtain employment; he also keeps track of the last four graduating classes by sending out a questionnaire each February. The C. E. School thus maintains direct contact with its most recent graduates.

John Perry has been an outstanding figure in city and county politics. Since 1935 he has represented the fourth ward (which embraces most of the Hill) in the City Council. Alderman Perry, furthermore, ranks high as a Republican leader, having been Republican County Chairman in a predominately Republican County for the past two years.

Besides taking an active part in politics, Professor Perry has lent his valuable services to the Boy Scouts of America. He is Commissioner of the Louis Agassiz Fuertes Council, which includes all of Tompkins County. As Director of Camp Barton, located a few miles south of Trumansburg on Cayuga Lake, he plans and directs the summer activities of Scouts in this Council. Only a week ago he acted as General Chairman of the Boy Scout Circus, held in the Drill Hall before a capacity audience of five thousand. As a recognition of his distinguished and valuable service to the boys of this area, the Council awarded Professor Perry the "Silver Beaver", the highest award a Council can present.

Engineering activities have also attracted Professor Perry's interests, as attested by his membership in the American Railway Engineering Association, Society for the Promotion of Engineering Education, Rod and Bob, and his position as secretary-treasurer of the Ithaca section of the A.S.C.E. since its organization in 1931. He is also a member of Phi Sigma Kappa Fraternity and the Masons.

# Prominent Among Our Faculty

## Frank Oakes Ellenwood

**Professor of Heat Power Engineering**

Every Cornell engineer at some time in his career comes in contact with heat power engineering. And in this contact he becomes acquainted through the use of his outstanding textbooks on the field with the work of Professor Ellenwood, if not with the man himself. Although a book does much to mirror the personality of its author, a textbook emphasizes merely the deliberate and logical qualities of scientific thought and lacks entirely the more humanizing elements that characterize a man.

Frank Oakes Ellenwood was born and raised in southern Ohio. In going to college he achieved the ambition of almost every boy to be independent and to go as far as possible away from home and its good but "restricting" infllluences by traveling across the continent to attend Stanford University. At Stanford he pursued the study of a boyhood fascination, engines and what makes them go. In college he participated in debating and also in track, running in the half mile and mile events.

Professor Ellenwood's teaching career has been long and varied. His first experience was teaching in the Public Schools of Ohio just after graduation from preparatory school. He was an assistant in the mechanical engineering department of Stanford during his senior year, 1903-04. After a few years in the field, he returned to Stanford as instructor. Coming to Cornell in 1911 as Assistant Professor of Heat Power Engineering, he was appointed Professor in 1916, and has served for 23 years as key-man in a department that has helped make Cornell's engineering school noted throughout the world.

Any man who is vitally interested in his field and who continually strives to improve his knowledge of his chosen line always finds his services in demand. Professor Ellenwood is no exception. A good share of his free time has been taken up with consulting work and research for leading American companies ranging in scope from a specialized study of steam turbines to the determination of the effect of temperature on pneumatic truck tires.

Academic honors and recognition of his scientific contributions are signified by membership in Sigma Xi, Tau Beta Pi, Phi Kappa Phi, and Atmos. A good organizer, he is a valuable addition to any group and has served on important committees for the American Association for the Advancement of Science and the American Society of Mechanical Engineers.

Taking a keen interest in student activities, Professor he has often been faculty advisor to the Cornell Branch of the A.S.M.E. Few students realize that the success and thoroughness of the mechanical engineers inspection trip to Detroit last year was due to Professor Ellenwood's farsightedness and painstaking attention to every detail which allowed a highly mobile group to cover the maximum amount of ground in a limited time without delay and confusion.

Professor Ellenwood is characterized by energy and ambition that does not allow a man to be content to stay in a rut, but to always keep up with his field and its latest developments. Consequently, a good portion of his spare time is taken up with the constant revision of his books on Heat Power Engineering, a thing which is no small task and demands painstaking accuracy and thoroughness.

However, he does find time to play golf, his main recreation, a game in which he consistently breaks 100. Domestically, he has turned his engineering knowledge to developing a very efficient and complete heating system for his home. So when the cold winds blow, and the room on the back hall just will not stay warm, he at least knows why.

LIQUID SULPHUR IS PUMPED FROM THE WELLS TO THE TOP OF LARGE VATS, WHERE A DISTRIBUTOR SPREADS THE SULPHUR IN THIN LAYERS TO FACILITATE COOLING, OVER AN AREA OF APPROXIMATELY 5½ ACRES. THIS METHOD OF HANDLING BUILDS UP A HUGE SOLID BLOCK OF SULPHUR.

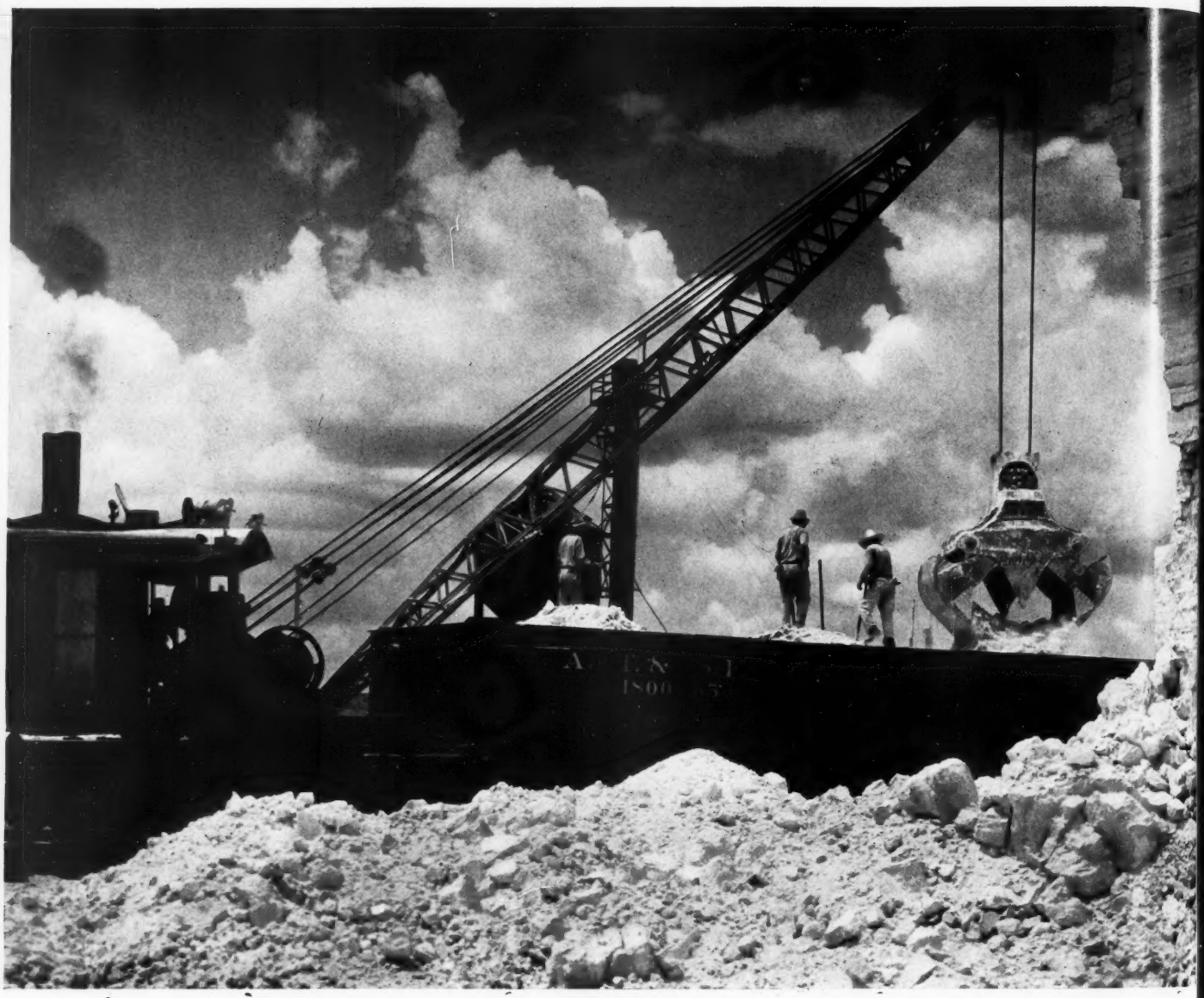
# MINING SULPHUR

## A portfolio of photographs illustrating operations of Texas Gulf Sulphur Company at Newgulf, Texas

PHOTOGRAPHS FOR TEXAS GULF SULPHUR COMPANY
BY ROBERT YARNALL RICHIE
Reprint: Courtesy Explosive Engineer

THE BLOCK OF SULPHUR, CONTAINED IN THE SULPHUR VATS, IS PREPARED FOR MARKET BY BLASTING. BUT BEFORE BLASTING, COMES DRILLING.

AFTER THE BLAST BREAKS UP THE SULPHUR FOR EASY HANDLING, A CREW OF MEN BARS DOWN THE LOOSE SULPHUR.



THE LOOSENED SULPHUR IS LOADED INTO GONDOLAS BY MEANS OF CLAMSHELL HOISTS HAVING A CAPACITY OF 2 CU. YDS. THE SIZE OF LUMPS OF SULPHUR LOADED INTO BOX-CARS IS CONTROLLED BY PASSING IT THROUGH A GRIZZLY.

# ...the telephone *succeeded!*

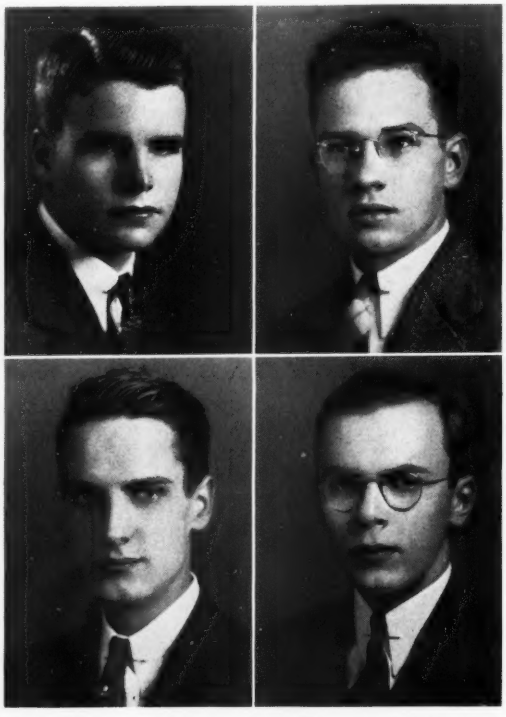
FIVE sophomores at a New England university had been assigned to report on the residential districts of a southern city, its principal products and the location of its plantations.

Hour after hour they thumbed through book after book in the library—all to no avail. Then one of them had a happy idea—why not telephone the city's Mayor? They did—and in a few minutes had all the information they needed.

No matter what the question—in college, in social life, in business—you'll find the telephone is often the quickest, most economical way to get the answer.

How about a telephone call to dad? Rates to most points are lowest any time after 7 P. M. and all day Sunday.

**BELL TELEPHONE SYSTEM**



## Do You Know These Men?

### WILLIAM P. LENTZ E.E. '39

If anyone planning a trip to the South is skeptical of southern hospitality, he could be reassured by Bill Lentz. For Bill, "there's nothing like it." Last labor Day found him in the middle of a nine-day sojourn to Chattanooga, Tennessee, where he received his most favorable impression. The southern belles were truly as lovely as they have been reported. Naturally, the southern trip was the highlight of Bill's junior summer, but he was enjoyably and profitably employed the first part of the summer with the R.O.T.C. Ordnance Division at the Aberdeen Proving Grounds at the headwaters of the Chesapeake Bay, and the second part of the summer with Mount-Vernon-Woodberry Mills, Inc. in Baltimore, his home town. At that cotton mill his duties consisted of seeking the most economical method to arrange the machinery in a plant layout for process control. The summer of his freshman year found him in a drafting position with the same concern.

Bill's most valuable experience was obtained during his sophomore summer, when he was employed for the installation of sub-station equipment on the Pennsylvania

(*Continued on page 23*)

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### JAMES JOHNSTON WILDER, M.E. '39

Although a good bit of Jim Wilder's time in the last two years has been spent in pushing a slide rule and turning out Mech Lab reports, he has managed to set aside his work long enough to twirl the baton in front of the Big Red Band for two seasons. As the highstepping drum major, Jim has taken many trips with the band.

"The most interesting one was the Harvard trip last fall," he says. "We rode through the worst of the hurricane area—at the terrific speed of five miles per hour—and got quite a look at the wreckage."

Jim seems to take quite an interest in seeing things for himself. Though he has no definite hobby, the pastimes in which he has dabbled, such as photography, microscopy, and nature study, all suggest a person with an observant eye.

His interest in the out-of-doors has stood him in good stead, for he has worked for three summers as nature study counsellor at Rochester's Y.M.C.A. Camp Cory. Though he hasn't gained any engineering ex-

(*Continued on page 23*)

### ROBERT H. NAGEL, C.E. '39

One of the most sincere participants in campus activities at Cornell, Bob Nagel has performed conscientiously everything which he has undertaken. A member of Llenroc Association and President during the last half of his Junior and first half of his Senior years, he has made many valuable contributions to the progress of that organization during its development. Entering the Association his Sophomore year, he took a vital interest in its advancement; during the period of his office, he altered the workings of the standing committees of the house and effected more smoothly-running internal functions.

This year Bob did a remarkable job, single-handed for a time, in straightening out the circulation department of THE CORNELL ENGINEER, serving in the capacity of Circulation Manager. He has also participated in the activities of the Student Joint Board of the C.U.R.W., was President and Treasurer of the Presbyterian Student Society, and yet has found time to maintain a very high scholastic average in the Civil Engineering School.

His Freshman and Sophomore summers were spent

(*Continued on page 23*)

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### EVERETT GEORGE MOELLER M.E. '39

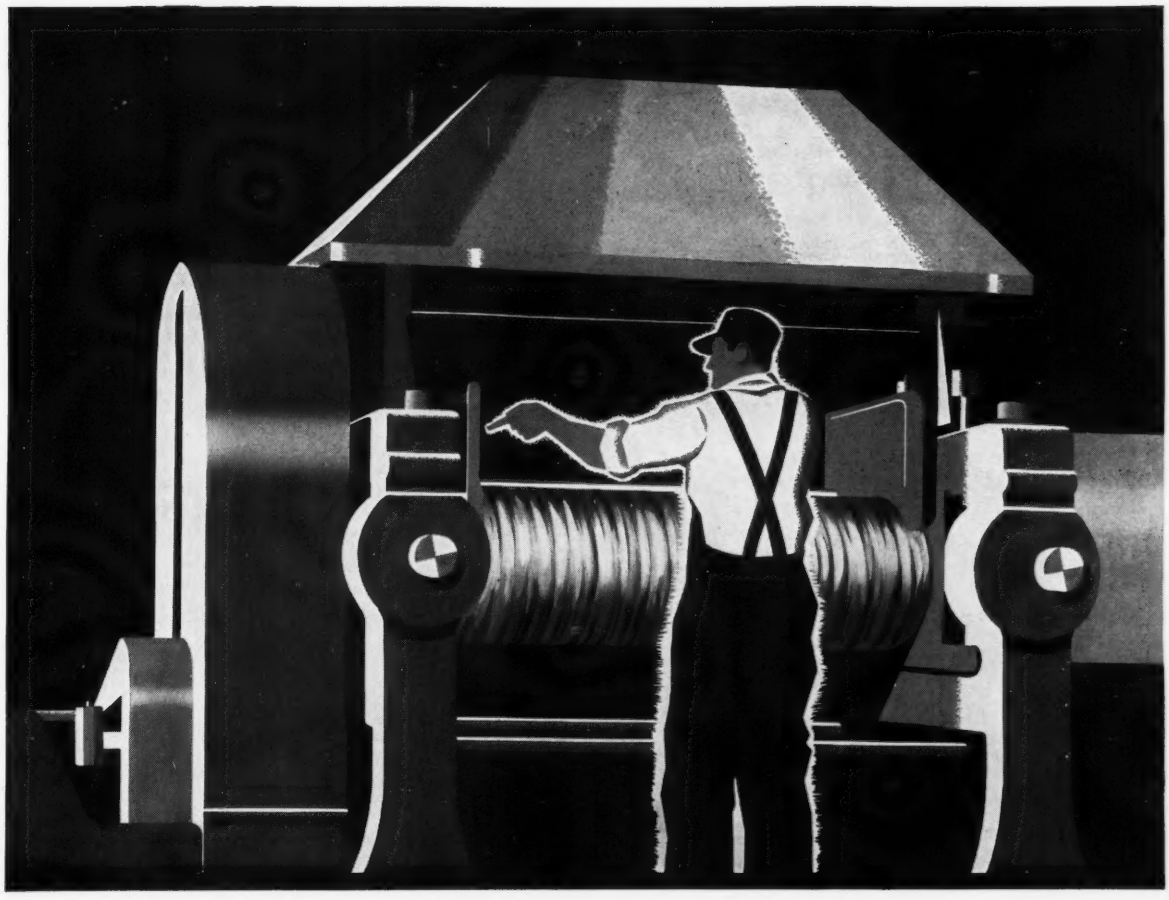
If you want to save yourself a lot of trouble when you graduate, bust as many prelims as you can and stay close to the bottom of your class. Otherwise you will find yourself in the situation of Ev Moeller. Ev is top man in his class and can't decide which offer of a position to accept.

Because of his high scholastic standing he has held a McMullen Scholarship and the Eidlitz Scholarship, and has been elected to Tau Beta Pi.

Ev's home town is in Waterbury, Connecticut. In New England Cornell's engineering school is not especially well known, and Ev had at first intended to go to MIT. However, Ev doesn't regret in the least his decision to come to Cornell, and his record here shows that he made no mistake.

During the summer of his freshman year, Ev worked with the American Brass Co. as a machinist's helper. In the summer of his sophomore year he was back with the same firm as a draftsman. Ev was on a steam turbine repair job at the Chase Brass Co. dur-

(*Continued on page 23*)



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MOLY

# WITH THE ENGINEERS

### CORNELL DAY

A radio device that prints a daily newspaper, a set of model airplanes, automobiles, and engines that illustrate the effects of modern design, the production of cold light from chemicals, the complete, student-constructed "Cornell and Cayuga Railroad", moving pictures in color of students performing typical laboratory experiments, and a comprehensive exhibit of alumni achievements supplied by such concerns as the Detroit Edison Company, the Standard Oil Company of New Jersey, the Pullman Company, Babcock and Wilcox, the Mennen Company, and the New York and San Francisco World's Fairs, will headline the annual Engineering Exposition, to be presented May 5 and 6 by students of the College of Engineering at Cornell University.

The exposition will be part of the Cornell Day program, especially prepared for more than 600 high school boys who will be brought to Ithaca for the week-end by representatives of Cornell Alumni Clubs in fifteen states. More than 3,000 visitors, including alumni and interested residents of the surrounding territory, are expected to see the show.

The School of Electrical Engineering, in addition to the radio printer, will have a color organ, a lie detector, a laboratory demonstration of "blind flying" with instruments, and numerous other exhibits. Students in the School of Chemical Engineering will demonstrate methods of smoke prevention and the manufacture of various types of chemicals, will produce electricity from fruit, and show a variety of chemical tricks in an exhibit called "Chemical Magic." Professor A. W. Brown will give his lecture and demonstration of the properties and uses of liquid air.

In the School of Civil Engineering, a model sewage plant will be in actual operation, as will the model railroad. Full-size wooden beams will be smashed in the giant 300,000 lb. materials testing machine, and stresses of engineering structures will be shown as color lines on a ground-glass screen in the photo-elasticity laboratory. There will also be a display of student drawings and of the regular laboratory equipment in mechanics, hydraulics, sanitary engineering, and other fields.

Most extensive will be the exhibits in the Sibley School of Mechanical Engineering. Testing of materials will be featured, with a 200,000 lb. tension test of iron and a compression test of concrete under 100,000 lb. pressure. Model automobiles will demonstrate front and rear wheel drive, two and four wheel braking, and the effect of the center of gravity in the design of automobiles and trucks. Model airplanes will be tested in the wind-tunnel, and miniature engines shown in operation. Machine design will also be represented by the College's unique collection of kinematic models and a display of student drawings.

The assembly of a thermostat and other industrial products will be shown by colored moving pictures and by student demonstrators in the micro-motion laboratory. Industrial engineering will also be represented by a model factory, and administrative engineers will have a model industrial plant with electric trains and other moving equipment which can be set in operation from a control board if the proper switch is thrown, to answer questions concerning industrial problems.

### THE A.S.M.E. CONVENTION

130 engineering students representing the Student Branches of the American Society of Mechanical Engineers of Brown, Clarkson Tech., Cornell, Maine, M.I.T., New Hampshire, Northeastern, R.P.I., Rhode Island State, Syracuse, Tufts, University of Vermont, Worchester Polytechnic, and Yale, gathered in Ithaca Friday, April 14, for the Seventh Annual Student Meeting.

Registration which began Thursday, continued through Friday. Friday morning a very interesting inspection trip in charge of Professor F. O. Ellenwood was conducted to the Morse Chain Company.

At the opening session held in Baker Lecture Room at 2:00 P. M. Friday, the delegates were welcomed by Beach Barrett, chairman of the Cornell Branch and by Dean Hollister. This was followed by a Technical Session with Paul Demong of Clarkson Tech as chairman. The papers presented and those who presented them were: "Building and Flying Gas Model Airplanes" by David Hunt of Worcester Polytechnic Institute, "Heat Transmission Through Building Walls" by Harrie W. Miley of Tufts College, "A Study of the Effects of Viscosity upon the Operating Characteristics of a Centrifugal Pump" by Fred Pollock of Clarkson Tech., "General Electric Turbo-Locomotive" by Herbert Sackett of Northeastern University, "Augmented Vacuum Lift on Airplane Wings" by Raymond H. Stockard of Rhode Island State College, and "Manufacture of Sulphite Paper" by P. V. Riera '40 A.E.M.E. of Cornell.

The Convention Banquet and Smoker was held in the Willard Straight Terrace room with Romer F. Good of Yale as chairman and Professor A. G. Christie of Johns Hopkins University as speaker. Professor Christie, who is president of the A.S.M.E., taught in Mechanical Engineering here in 1904-05 and has taught at Wisconsin and worked for Westinghouse, Allis-Chalmers, and other important industrial concerns. He is an authority on steam turbines, gas measurement, steam central stations, and public utilities.

At 9:00 A. M. on Saturday, the delegates again assembled in Baker Lecture Room for the second Technical Session with Henry Clay Osborn III of Rhode Island State College chairman. The remaining speeches were: "Linkage in a Tinned Steel Case Gas Meter" by Arthur L. Brown of Brown University, "Comparative Engineering Aspects of the New York World's Fair of Today and 1853" by F. A. Canary of the University of Vermont, "The Development of a Gas Engine Indicator" by Peter M. Sampatacos of the University of New Hampshire, "Application of Dimensional Analysis to the Design of Cooling Towers" by Richard J. Donohue of M.I.T., "An Investigation to Determine Proper Type of Prime Mover for a C-2 Cargo Ship" by Louis Soltanoff of R.P.I., and "Automatic Banking Device for Automobiles" by Thomas Verrill of the University of Maine.

At 1:00 P.M., luncheon was held in Martha Van Rensselaer Hall auditorium with the awarding of the prizes for the best student papers by Professor A. G. Christie. Judges of the papers numbered 22, in charge of Professor K. E. Svenson of M.I.T. The Cornell judges were Prof. P. H. Black, Honorary Chairman, and J. H. Grotzinger, '39 M.E. The First Prize of $45 was awarded to Raymond H. Stockard of Rhode Island State. Second Prize of $25 to

Richard J. Donohoe of M.I.T., Third Prize of $15 to Thomas Verrill of Maine, and the "Old Guard" Prize of $10 to Arthur L. Brown of Brown University.

Saturday evening the convention delegates and their dates attended the annual Engineers' Ball in the Willard Straight Memorial Room.

Student officers of Cornell Student Branch are: Chairman, Beach Barrett '40 M.E.; Vice Chairman, Teh-Chang Koo '40 M.E.; Secretary-Treasurer, J. E. Billings '40 M.E. Chairman of the Convention Committee was T. S. Dunham '40 A.E. and Chairman of the Publicity Committee was S. L. Scott '40 A.E.

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### A.I.E.E.

Dr. William A. Lewis, Jr., director of the School of Electrical Engineering addressed the Ithaca Section of the American Institute of Electrical Engineers Wednesday, April 19, at 8 p. m. in Franklin Hall. He discussed "Symmetrical Components Without Mathematics."

The method of symmetrical components is widely used in the study of faults in transmission systems, but is usually discussed in terms of mathematics. Dr. Lewis presented the subject from the physical standpoint so that it will be readily understandable not only to engineers but to others.

Before the lecture, members of the chapter and their guests gathered in Willard Straight Hall for an informal dinner at 6 p. m. Guest of honor was Professor C. L. Dawes of Harvard University, vice president of the A.I.E.E. for the northeastern District. He spoke briefly about institute affairs.

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### TIME STUDY

Practice in an actual factory under industrial conditions was had by the Micro-motion Laboratory course Wednesday, March 29, when the class spent the entire day at the Brockway Motor Truck Company in Cortland, New York. Fourteen students made the trip, arriving at the factory at 9:00 A. M.

Instructor Herbert L. Manning and Mr. Torry B. Luce of the Brockway Motor Company, who made the trip possible, conducted the group about the shop to give the students a general idea of the processes involved in making a modern motor truck. A process chart of a typical part was then made, starting from the receiving department, through the various processes and operations until it was put in place on the truck chassis.

The afternoon was spent in the machine shop, which finishes malleable cast iron chassis parts and steel forgings. Here the group had the opportunity to make time studies on actual jobs on production. For the most part the operations were fairly long ones, which were well suited to inexperienced beginners in time study work.

The cooperation of Mr. William Keenan and Mr. James Kane of the machine shop made the experience a valuable one, which, it is hoped, can be repeated for future classes.

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### A.S.C.E.

Professor E. E. Schoder of the School of Civil Engineering, discussed "Model Studies on Energy Dissipation below Dams" at a dinner meeting of the Ithaca Section of the American Society of Civil Engineers Thursday, April 20, in Willard Straight Hall.

Dr. Schoder has acted as consultant for numerous private construction companies and for the U. S. Army Engineers Corps on hydraulic problems, and has set up numerous experiements in the Cornell Hydraulics Laboratory on Beebe Lake. He is recognized as an authority in this field.

### ANNUAL ENGINEERING DINNER

Prizes and scholastic honors in the College of Engineering were announced by Dean S. C. Hollister April 18 at the annual Engineering Dinner and Honor Day in Willard Straight Hall at 6:30 P. M. The principal address was delivered by Professor Lyman P. Wilson of the Law School, who brought forth little-known facts to show that England, throughout history, has been the strongest friend of the United States.

Walker L. Cisler '22 of Newark, N. J., President of the Cornell Society of Engineers, was in Ithaca to take part in the program of the Dinner. In behalf of the Society, he presented prizes to the two sophomores in each of the schools of the College of Engineering having the highest academic standing, and five cash awards to senior editors of the CORNELL ENGINEER. Willis H. Carrier '01, vice president of the Cornell Society of Engineers, was also one of the guests at the dinner.

Thirteen new prizes offered by the Cornell Society of Engineers, including book prizes to the two highest sophomores in each of the schools of mechanical, civil, electrical, and chemical engineering, and cash awards to the five senior editors of the CORNELL ENGINEER, were added this year to the five Sibley Prizes in Mechanical Engineering and the Fuertes Medal in Civil Engineering.

Winner of the Fuertes Medal in Civil Engineering was William F. Vogel '39. The five Sibley Prizes were awarded as follows: first, Crawford G. Adams '40 E.E.; second, William D. Wallace '40 M.E.; third, Martin Goldstein '40 M.E.; fourth, Everett G. Moeller '39 M.E.; and fifth, Beach Barrett '40 M.E. Cash prizes from the Cornell Society of Engineers to the five senior board members of the CORNELL ENGINEER went to W. Harry Johns, Albert T. Mayle, Jr., Robert H. Nagel, Thomas L. Snowdon, and John G. Tammen. Cornell Society of Engineers book prizes to sophomores were awarded to James M. Snyder and Oliver N. Salmon in Chemical Engineering; Henry W. Lansing and Edmund B. King in Civil Engineering; Edmund E. Friedrich and Kenneth A. Kesselring in Electrical Engineering; and David M. Bradt and Robert W. Haase in Mechanical Engineering.

The Kappa Tau Chi Award, a bronze plaque and silver key, went to James H. Moore, Jr. '42, the freshman having the highest grades in Administrative Engineering. A set of drawing instruments, offered by the Frederick Post Co. to the freshman in the College with the highest average, went to Maeto L. P. Go '42.

The Dean's Honor List, which includes the names of 128 students whose averages are 85 or above, follows:

#### Sibley School of Mechanical Engineering

Seniors: Albert R. Davis, II, Walter L. Harding, and Everett G. Moeller; Juniors: Beach Barrett, Charles R. Baxter, Jr., Sherman H. Creed, Morgan H. Habicht, Kingman W. Page, William D. Wallace; Sophomores: John C. Bellows, David M. Bradt, Robert M. Frank, Robert W. Haase, Frederick R. Hillsley, John J. Hillsley, Jr., Warren P. Horsfall, Lawrence A. S. Hough, Shurly R. Irish, Jr., Jean P. Leinroth, Jr., Norman T. Nelson, Jr., Robert P. Northrup, Robert E. Ohaus, Thomas C. Shreve, and Alexander E. Walker, Jr.; Freshmen: George W. Bouton, Gifford Bull, George F. Critchlow, John R. Dingle, Charles F. Dye, Jr., Richard A. Graham, Fred H. Guterman, Charles T. Henrich, Raymond A. Lander, Jr., Paul E. Luce, William H. McDonald, Jr., Lloyd J. Moulton, Abbott A. Putnam, Robert B. Resek, Ferdinand P. Schoedinger, Jr., William F. Voecks, B. J. Walker, and Dan R. Wells, Jr.

(*Continued on page* 22)

# TELEVISION

(*Continued from page 6*)

lic. Television is ready to take its place alongside telephone and radio.

The range of television is not only limited but regulated. Because the radio waves are so crowded and the 6,000 kilocycles spread required by television, television has had to use the high frequencies. The Federal Communications Commission has designated seven channels between 44,000 and 108,000 kilocycles of which the lower channels are the most desirable, because the higher the frequency, the more difficult it is to build a transmitter of a given efficiency and the less sensitive are the receiving circuits. The seven channels limit the number of stations to seven within any one area. The natural range of television is the horizon and a quarter-mile high antenna will transmit only about fifty miles. Few cities have buildings high enough to transmit even close to fifty miles. There are 96 metropolitan areas in the United States of 100,000 population and over, which is considered to be the minimum population capable of supporting television services at present. Assuming 400 foot towers are used which serve an area of 25 miles radius, these 96 areas constitute only 6% of the area of the United States but over 50% of the population and more of the buying power; a potential market of 60 million persons.

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# COLLEGE NEWS

(*Continued from page 21*)

**School of Electrical Engineering**

Seniors: Arthur H. Moore, and Robert B. Roe; Juniors: Crawford G. Adams, Bruce E. Nelson, Robert L. Petrie, and Edward C. Yeaton; Sophomores: William C. Flickinger, Edmund E. Friedrich , and Kenneth A. Kesselring; Freshmen: Albert Brodzinsky, Francis B. Burke, James W. Cochrane, Donald W. Human, Jimmie W. Killian, Leo E. Lipetz, Harry J. Lipkin, Joseph C. Littleton, Corles M. Perkins, Charles L. Seeger, III, William J. Sloughter, Stanley R. Thorne, and Floyd E. Williams.

**School of Civil Engineering**

Seniors: Ivan L. Bogart, Carl Harper, Gene L. Hintgen, Paul A. Schaaf, Joseph M. Steele, II, and William F. Vogel; Juniors: William E. Fisher, William N. Freeman, William A. Gay, Robert J. Reeves, Edwin P. Swatek; Sophomores: Richard G. Davis, Edmund B. King, and Henry W. Lansing; Freshmen: Maeto L. P. Go, Donald R. Goodkind, John M. Hanson, David W. Milhan, James H. Moore, Jr., Lawrence E. Peterson, Jr., and Howard Simpson.

**School of Chemical Engineering**

Seniors: Stanley S. Christenfeld, Joseph Coors, Beryl M. O. Present, and John H. Weakland; Juniors: Frederick Fahnoe, George A. Gentes, Robert A. Gumbinner, Leon Lazare, Edward A. Levine, Ralph S. Ludington, and Robert W. Pressing; Sophomores: Robert K. Finn, Irving Gerzog, James M. Meyers, William R. Percy, Sol Ruden, Norman W. Ryan, Oliver N. Salmon, and James J. Snyder; Freshmen: David Altman, John G. Benson, Austen W. Boyd, David L. Caldwell, James M. Davison, Robert J. Deady, Rudolph Deanin, John C. Eddison, Robert J. Fritz, Gordon Kiddoo, William N. Kruse, Edward D. Lewis, William A. McHugh, Philip H. Permar, Ernest R. Roth, Frederick G. Schumacker, Mircea R. Sfat, Julian C. Smith, Jr., William H. Tilley, and Robert P. Zabel.

Members of the faculty committee who arranged the affair were S. S. Garrett, chairman, E. V. Howell, C. C. Winding, and F. J. Bristol.

●

**NEW E.E. FACULTY MEMBERS ANNOUNCE INVENTION**

The discovery of a new principle in armature winding, which will save electrical manufacturers hundreds of thousands of dollars a year, has been announced by two members of the staff of the School of Electrical Engineering, Professor M. G. Malti and Dr. Fritz Herzog, research associate. They will describe how they arrived at their discovery by mathematical processes in a paper to be presented at the national convention of the American Institute of Electrical Engineers in June.

Professor Malti explained that in the past manufacturers of electric motors and generators have had to make a different die for cutting slots in the armature of each separate type of machine, because the winding of armatures has followed a set formula, which, it was believed, could not be varied. This practice has an important effect on the cost of such equipment, because each die costs between $5,000 and $20,000.

By the new principles discovered at Cornell, the old method of winding armatures has been so revised that the same slot die may be used for numerous different types of machines. Thus the cost of each die is distributed over several machines, resulting in the saving of thousands of dollars to manufacturing concerns.

## Do You Know These Men ?

(*Continued from page* 18)

WILLIAM P. LENTZ, E.E. '39

Railroad near Harrisburg by the Arundel Corporation. What Bill considers just as important as scholastic achievement is the learning not to rub people the wrong way. "After graduation, you don't get much experience with the workers' viewpoint. You have to learn it during the summers of your college years."

**Activities: Letter 150 lb. crew; Crew Club; interfraternity touch football, basketball, badminton; Frosh-Soph Flag Rush Committee; Electrical Show 2, 3; Recording Secretary Eta Kappa Nu; Chairman Scholarship Committee Phi Gamma Delta; Business Manager 4, Staff 2, 3, of Frosh Camp.**

●

JAMES JOHNSTON WILDER, M.E. '39

perience in these vacations, Jim believes that he has benefited in many other ways. His technical education is not being neglected, either, as is proved by his membership in Atmos, and his recent election to Tau Beta Pi.

**Home Address: Rochester, N. Y.**

**Activities: Freshman Lacrosse, Drum Major 3, 4; Advanced R.O.T.C. Officer's Club, Sphinx Head, Atmos, Scabbard and Blade, Tau Beta Pi, Navy Day Ball Committee 3, 4, Clef Club President, Beta Theta Pi.**

●

EVERETT GEORGE MOELLER ME '39

ing the summer of his junior year.

Philately (stamp collecting to you engineers) was one of Ev's interests before coming to Cornell, but since then his scholastic and other activities have given him little time for anything else.

**Activities: Interfraternity football, baseball, hockey; Cornell Day Committee; Vice-president A.S.M.E.; McMullen Scholarship 2; Otto M. Eidlitz Scholarship 3, 4; Tau Beta Pi; Phi Kappa Phi; Librarian, Theta Chi.**

●

ROBERT H. NAGEL, C.E. '39

with the L. A. Fuertes Council in the Boy Scout Camp on Lake Cayuga. Last summer he was occupied in experimentation work prior to a possible installation of a rapid filtration sewage treatment plant for Englewood, New Jersey.

Bob has as yet no permanent connections, but hopes to apply his Sanitary Engineering training to the problems of a mechanical equipment manufacturing concern.

**Activities: Tau Beta Pi; Chi Epsilon; Alpha Phi Omega; Student Joint Board, C.U.R.W.; President and Treasurer Presbyterian Student Society; President Llenroc Association; State Tuition and Yonkers Scholarships.**


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# CORNELL SOCIETY of ENGINEERS

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WILLIS H. CARRIER '01, Vice President
Carrier Corporation, Syracuse, N. Y.

PAUL REYNEAU '13, Secretary and Treasurer
107 East 48th Street, New York, N. Y.

DAVID HARMON '31, Recording Secretary
21 Audubon Avenue, New York, N. Y.

*"The objects of this Society are to promote the welfare of the College of Engineering at Cornell University, its graduates and former students and to establish a closer relationship between the college and the alumni."*

## President's Column

Fellow Engineers:

The present administration year of the Society is rapidly drawing to a close and in keeping with the Constitution and By-Laws the annual meeting will be held on May 3 at the new Cornell Club in New York. At this meeting the election of officers for the ensuing year will take place. The nominating committee, composed of Edward C. M. Stahl, '13, chairman; George N. Brown '08, and Bernard A. Savage '26, have unanimously nominated the following members for election at that time:

*President,* Willis H. Carrier '01, Syracuse.
*Vice-President,* John P. Syme '26, New York. (Executive & New York Regional)
*Vice-President,* Furman South, Jr., '12, Pittsburgh, Pa. (Pittsburgh Regional)
*Secretary-Treasurer,* Paul A. Reyneau '13, New York
*Recording-Sec'y.,* Herbert H. Reynolds '11, New York.

ALFRED G. GRAYSON
Chairman, Committee on Meetings

The Society has been fortunate in obtaining as the principal speaker for the evening, Mr. Robert Lane, Chief Editorial writer and former Washington correspondent of the Newark Evening News. Because of his long association with national and international affairs, Mr. Lane is eminently qualified to speak on the European situation as it exists today. It is an opportunity for the members and their friends to hear him speak.

Recently there was mailed to almost fifteen thousand the annual report of the Society. It was sent to all those who have attended the College of Engineering irrespective of whether or not they were members of the society. It is by means of this annual message that contact with this great body of Cornellians is maintained. It is hoped that those of you who are receiving the CORNELL ENGINEER, by virtue of your membership, will renew your membership and will urge your friends to do likewise. Our present membership is about one thousand. If each one of you can secure one new member, our membership would be practically doubled and our activity materially increased. Your assistance in accomplishing this is earnestly sought.

At the time of writing this letter it is my privilege to attend the Honor Day Dinner of the College of Engineering and to present on behalf of the Society the awards to the five retiring members of the board of the CORNELL ENGINEER and to the eight sophomores whose scholastic standing has been outstanding. It is the first year that these awards have been made, and it is the result of action taken last year at the suggestion of Mr. Requardt, our immediate past president.

The members of the Board who received the awards were:

W. Harry Johns
Albert T. Mayle
Robert H. Nagel
Thomas L. Snowdon
John G. Tammen

The sophomores are:

*Chemical Engineering*
James M. Snyder
Oliver N. Salmon

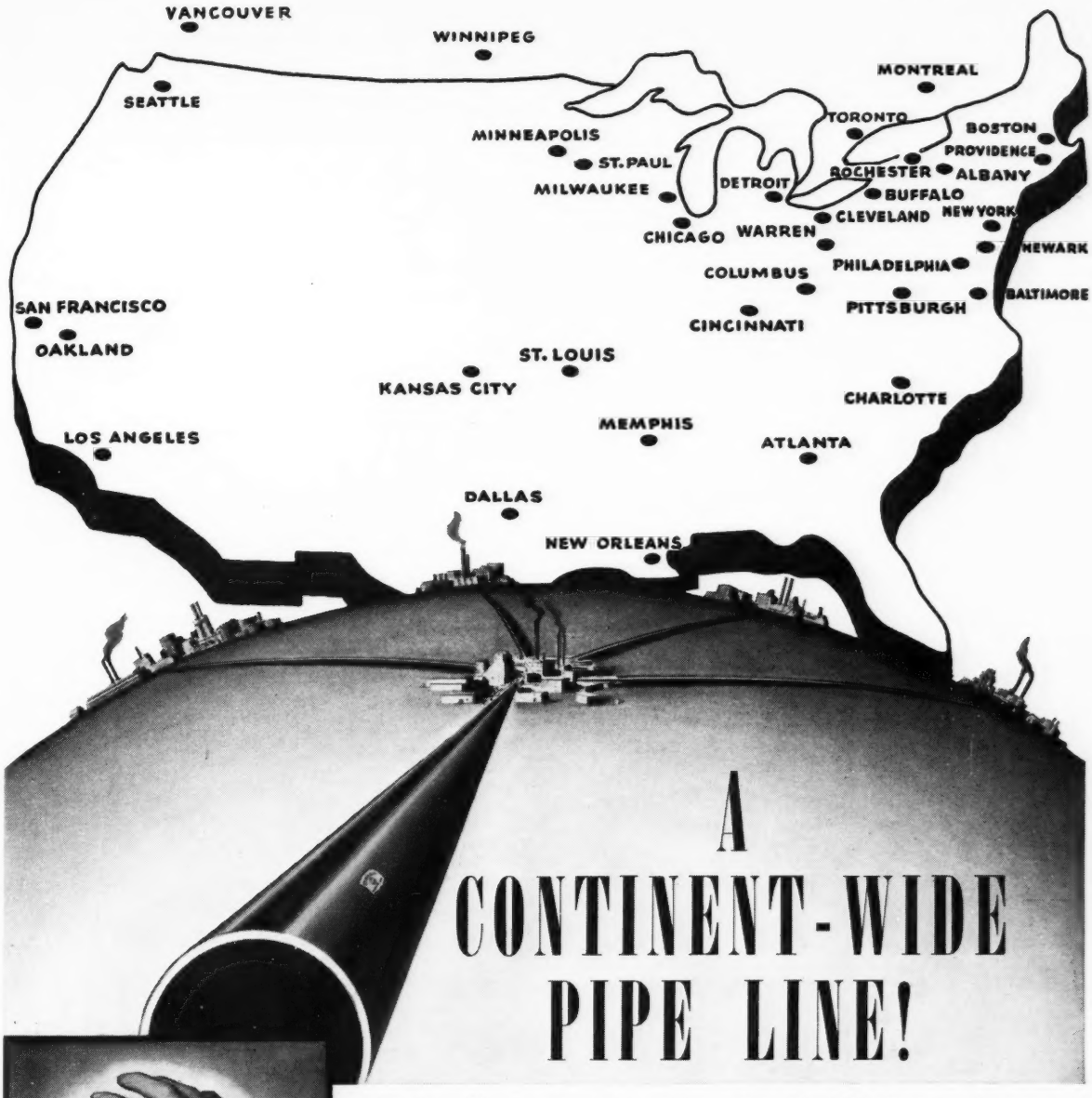
*Civil Engineering*
Henry W. Lansing
Edmund B. King

*Electrical Engineering*
Edmund E. Friederichs
Kenneth A. Kesselring

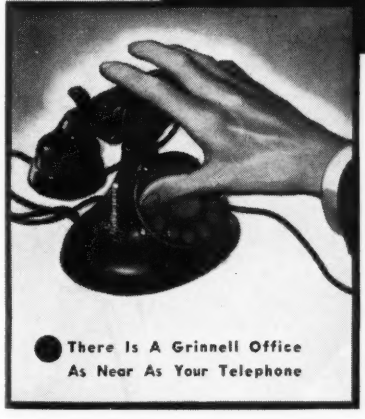
*Mechanical Engineering*
David M. Bradt
Robert W. Haase

So this issue marks the beginning of the duties of the new board of the CORNELL ENGINEER. I wish to express to them the continued interest of our Society in the publication. We desire to cooperate with them in increasing circulation and to assist them in every way possible.

Sincerely yours,
WALKER L. CISLER,
*President*




# A CONTINENT-WIDE PIPE LINE!



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# ALUMNI NEWS

**LUCIAN C. JACKSON, ME '91,** is a patent attorney with an office at 29 Ramsdell Avenue, Buffalo.

**S. WILEY WAKEMAN, ME '99,** vice-president of the Bethlehem Shipbuilding Corporation, was elected vice-president of the Society of Naval Architects and Marine Engineers.

**ERNEST D. BUTTON, CE '99,** has been re-elected president of the J. B. Lang Engine and Garage Company, Ithaca. His son, John L. Button, '25, is secretary and treasurer, and both are directors of the firm.

**JOHN T. THOMAS, ME '05,** is with the Bureau of Engineering of the city of Los Angeles, Venice Boulevard at Shell Avenue, Los Angeles, Cal.

**CARL F. MEYER, ME '08,** is with the Income Foundation Fund, Mercantile Trust Building, Baltimore, Md. He lives at 211 West Lanvale Street, Baltimore.

**FRANCIS P. GARY, ME '10,** is a sales engineer with Lawrence V. Fraley and Son, St. Louis, Mo. He is married and lives at 339 N. Taylor Avenue, St. Louis.

**LEWIS P. SWIFT, ME '12,** has been elected president of the Taylor Instrument Company, Rochester. He has been with the company since 1904, with the exception of the years 1908 to 1912 when he was at the University. He has been successively manager of recorder sales, manager of the sales engineering department, and chief engineer. His son, Lewis P. Swift, Jr., is a member of the Class of '40.

**STUART M. FORD, ME '14,** is with the Collins and Aikman Corporation, Roxboro, N. C., the largest manufacturers of upholstery fabrics for automobile use in the United States.

**KENNETH C. McCUTHEON, ME '15,** and Professor John Chipman of Massachusetts Institute of Technology have been given the Robert Woolston Hunt Award of the American Institute of Mining and Metallurgical Engineers for their paper on "Evolution of Gases from Rimming Steel Ingots." McCutcheon is with the American Rolling Mill Company, Ashland, Ky.

**ALAN F. WILLIAMS, CE '15,** is division engineer with the Western Pacific Railroad Company. He was recently transferred from Elko, Nev., to Sacramento, Cal., where his address is 1904 J Street.

**HARLOWE T. HARDINGE, ME '16,** is the inventor of an "electric ear" which greatly increases the efficiency of grinding mills for ore, cement, coke, coal, limestone, silica sand, clay, and other materials. The amount of material fed to such mills has formerly been regulated manually by operators according to the sound of the mill. Hardinge's invention does this mechanically through a microphone and electric connections which regulate the flow of material for maximum efficiency, eliminating the human element. One of the mills of International Nickel Company, using the "electric ear", is showing a production increase of eleven per cent. Hardinge is vice-president and general manager of the Hardinge Company, York, Pa., manufacturers of ball mills; recently, he described his invention before the American Institute of Mining and Metallurgical Engineers.

**LOUIS J. GALBREATH, ME '17,** is a technical advisor for the Revere Copper and Brass, Inc., 230 Park Avenue, New York City. He is married, has a son and a daughter, and lives at Mile Road, Suffern.

**WILLIAM LITTLEWOOD ME '20,** now vice-president of American Airlines, Inc., vice-president of the Institute of Aeronautical Science, and vice-president of the Society of Automotive Engineers, was co-chairman of the S. A. E. National Aeronautical Meeting in Washington, D. C., March 16 and 17. More than 100 experts took part in the meetings and inspection trips, listening to technical papers and watching demonstration flights of newly-developed airplanes.

**ALFRED B. WALTON, ME '22,** is with the Certain-Teed Products Corporation, Beaver and Military Avenues, Buffalo.

**WILLIAM C. SUTHERLAND, EE '28, 29,** who was recently appointed manager of the Air Conditioning Sales Company, Westinghouse air conditioning distributors for western Pennsylvania, is also senior announcer for the National Broadcasting Company at Station KDKA, Pittsburgh. His second son was born last November 19. His address is 1215 Winterton Street, E.E., Pittsburgh, Pa.

**FRANK G. SCHINZEL, CE '38,** sailed for Haifa, Palestine, where he will be an engineer for an American construction firm. Since graduation he had been in Plainfield, N. J., engineering department. His home address is 840 Hobart Avenue, Plainfield.


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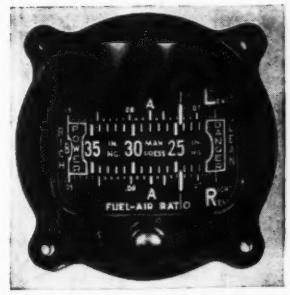

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# DYNAMIC ECONOMICS

(*Continued from page* 8)

in charge of Industrial Relations, later in the office of the President. More recently he has been placed in executive charge of one of our broadcasting stations, WGL at Fort Wayne, Indiana.

I recall walking up to a ball park one summer evening with a young man who occupied a minor clerical position in our Railway Department. I asked him what he was doing to prepare himself for a better job. Later he enrolled in the Westinghouse Technical Night School. At the end of his freshman year, he stood Number One in student ability, personality, and interest in student activities. Before he graduated, he was appointed Assistant Director of Production for the plant. Later, he asked for a position on the Faculty of the Night School at no salary. He wanted to spend his time talking with students who had missed one or two classes, to tell them what the training had meant to him.

Then there was another young man who played the part of a Westinghouse salesman in a student dramatic production. So well did he play his part that three managers the next day wanted him to join their department. Today he heads the Air Conditioning Department of our Company.

I hope that during my talk with you this morning I have impressed you with the importance of studying dynamics and economics as an important part of your preparation for work as an engineer. For a number of years you have been storing up latent energy in the form of education. When you get into the field, you will find that it requires a tremendous amount of both latent and kinetic energy to overcome inertia. We are moving from an individualistic toward a social order. Perhaps our biggest present-day problem is unemployment. I think it will only be solved by the hard work of such men as yourselves who are willing to establish confidence on the foundation stone of honesty. The price of freedom is self-control and the price of democracy is understanding.

On a previous occasion I suggested that the practice of calling classes ten minutes after the hour, then in vogue, led to college men being late at meetings the rest of their lives. Many of us in industry agree that there is more time lost being on time at meetings than in any other way. The University promptly changed all of its classes to meet on the hour. Today I would like to leave with you another suggestion. Next June you will receive a piece of parchment on which it says, in substance, that having completed your education at Cornell, you now go out into the world to receive "all the rights, honors, and privileges that thereunto appertain." This is the formula of a past age. Your diplomas will some day convey a different message. Meanwhile, don't take these "rights, honors, and privileges" too seriously. I would rather change the wording to "Do right, be honorable, and accept responsibility."

# HOUSING AMERICA

(*Continued from page* 10)

America has much to learn from Europe. England has been particularly housing-conscious. Eighty-five years ago the British government passed the first law to aid housing conditions of the working people. Since the World War, England has been conducting a great housing program, promoted by such prominent political leaders as Lloyd George, Christopher Addison, and Stanley Baldwin, and backed by the efforts of Sir Raymond Unwin, famous housing authority. It is estimated that in five years slums will have vanished from England. Over 2,000,000 dwellings have been built, 56% with public aid, 46% by unassisted private enterprise. Already benefits have been realized in increased health of the poorer classes. Furthermore, construction of housing by private enterprise was stimulated by government housing projects, for as people of lower incomes received better housing, people of larger incomes demanded better housing from private enterprise. Since the war, 3,000,000 new dwellings have been built in Germany, 80% with public aid, although Germany has not had the slum conditions which England and the United States have had. Similarly, housing activities have been promoted in the remaining European countries.

America is becoming increasingly housing-conscious. The federal legislation toward better housing, which was regarded at first by many as merely a relief procedure, is now recognized as the genesis of a nationwide housing program. Such a program requires the services of a multitude of people: the architect, the technician, the scientist, the financier, the business man, the town planner, the engineer, the landscape gardener, the politician, the builder, the industrial organizations of the skilled laborers of the building trades. The combined efforts of all are essential to the success of a housing program, for an effective program can be put over only through the organized endeavour and ability of everyone.

A nationwide housing program provides a great opportunity for the architect to develop a really modern architecture. Likewise, the engineer has opportunity to prove his worth, for he is called on to aid in the design and construction of the housing and to provide the necessary improvements, such as roads and pavements, water supply, drainage, sewage disposal, illumination, ventilation, heating, and public utility services.

From the viewpoint of people needing better housing, from the viewpoint of persons engaged in occupations concerned with building better housing, and from the viewpoint of members of a society which demands a decent standard of living, providing of adequate housing is one of the greatest problems of the day; but success in providing decent housing can not be judged by the theories evolved concerning it. It must be judged by the houses which are built.

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2. Six-year course leading to the degrees of Bachelor of Arts and Bachelor of Civil Engineering.
3. Four-year course in Administrative Engineering in Civil Engineering leading to the degree of Bachelor of Science in Administrative Engineering.

### Mechanical Engineering

1. General four-year course leading to the degree of Bachelor of Mechanical Engineering. Options are offered in the senior year in Power-Plant Engineering, Heat Engineering, Industrial Engineering, Automotive Engineering, Aeronautical Engineering, and Hydraulic Power-Plant Engineering.
2. Five-year course leading to the degree of Bachelor of Mechanical Engineering.
3. Six-year course leading to the degrees of Bachelor of Arts and Bachelor of Mechanical Engineering.
4. Four-year course in Administrative Engineering in Mechanical Engineering, leading to the degree of Bachelor of Science in Administrative Engineering.

### Electrical Engineering

1. General four-year course leading to the degree of Bachelor of Electrical Engineering. A Physics option covering the third and fourth years is available.
2. Six-year course leading to the degrees of Bachelor of Arts and Bachelor of Electrical Engineering.
3. Four-year course in Administrative Engineering in Electrical Engineering leading to the degree of Bachelor of Science in Administrative Engineering.

### Chemical Engineering

1. Five-year course leading to the degree of Bachelor of Chemical Engineering.

### Graduate Work

Courses leading to the Master's and Doctor's degrees are available in all the above fields.

### Engineering Research

Facilities are available for conducting fundamental and industrial researches in the foregoing fields in cooperation with industries.

---

**For Detailed Information, Address**

**The Dean of the College of Engineering, Cornell University**

**Ithaca, New York**

# G-E Campus News

## LIGHTNING TAMERS

ALADDIN had his lamp, and Robinson Crusoe had his man Friday. But they run poor seconds to General Electric's lightning makers, as visitors to the New York World's Fair will see.

For years at the world-famous G-E high-voltage laboratory in Pittsfield, Mass., visitors have seen powerful man-made lightning crash across 30-foot gaps, and power arcs twist and curl their way into the air. But the apparatus does more than produce merely spectacular demonstrations. It makes possible many experiments that provide data for the constant improvement of transmission equipment.

The star of the public demonstrations has been a 10,000,000-volt generator. Now the star has had her face lifted, and the lightning makers have a new streamlined unit. It will be a feature of the G-E building at the New York Fair. Housed in Steinmetz Hall, it will be a tribute to that great G-E pioneer in artificial-lightning experimentation—the late Charles P. Steinmetz.

Karl B. McEachron, Ohio Northern '13 and ex-Test man, noted lightning investigator for General Electric, is in charge of the exhibit. A specially trained group of engineers will assist him in presenting the more than 4000 shows planned for the fair.

## MODERN TORTURE

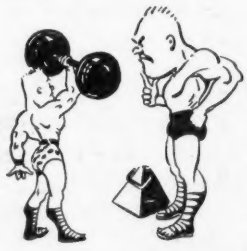
THEY ARE hung by their thumbs, pulled by their toes, and put into furnaces for ten years.

These are the well-organized tortures conducted not by villains of a medieval novel but by G-E engineers. They are the "creep" tests conducted on sample rods of various steels before these steels are used in the manufacture of turbines.

As explained by E. L. Robinson, St. Lawrence, '11, Harvard Engineering School, '14, G-E engineer, the excessive heat under which a turbine operates softens the metal of which it is made, and the metal extends, or creeps. If this creeping exceeds a dimensional change of a hundred-millionth part per hour, or is not symmetrical and uniform, the turbine shell may leak or the speeding rotor may get out of line.

To avoid these troubles, types of alloyed steels that restrict creeping must be used. Therefore, the creep tests. Sample rods are held fast and stretched until they break. They are put into electric furnaces and kept there for as long as 10 years; temperatures as high as 1200 F being maintained. Careful inspection of the results shows whether the steel is of the proper type.

This creep test is only one of the many made on each G-E turbine. For many other engineers—veterans and Test men alike—conduct other exacting tests.



## WORLD'S CHAMPION

SITTING complacently on his new throne in the G-E Research Laboratory is the new midget weight-lifting champion. Not only does he completely outclass other contenders, but it seems probable that he will continue to do so for some time.

This champion is the world's most powerful permanent magnet for its size. Even though he weighs only 1/250th of a pound, he is capable of lifting nearly 1500 times his own weight.

The midget is made of a material known as Alnico, introduced by the Research Laboratory as a heat-resisting alloy. Alnico magnets have been used for some time in radios, motors, generators, and other electric equipment, replacing electromagnets, which require current for their operation.

**GENERAL ELECTRIC**

98-136C